2. What is the $x$-coordinate of the point of inflection on the graph of $y=\frac{1}{3}x^3+5x^2+24$?

(A) 5 (B) 0 (C) $-\frac{10}{3}$ (D) $-5$ (E) $-10$

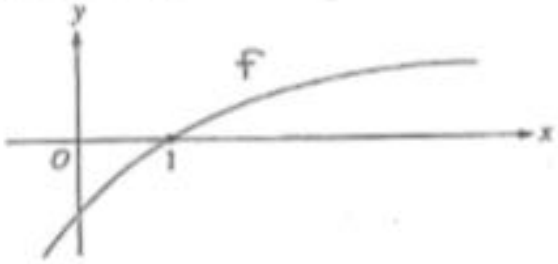
3. If $x^2+xy=10$, then when $x=2$, $\frac{dy}{dx}=$

(A) $-\frac{7}{2}$ (B) $-2$ (C) $\frac{2}{7}$ (D) $\frac{3}{2}$ (E) $\frac{7}{2}$

4. A particle moves along the $x$-axis so that its position at time $t$ is given by $x(t)=t^2-6t+5$. For what value of $t$ is the velocity of the particle zero?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

5. The graph of a twice-differentiable function $f$ is shown in the figure below. Which of the following is true?




(A) $f(1)<f'(1)<f''(1)$
(B) $f(1)<f''(1)<f'(1)$
(C) $f'(1)<f(1)<f''(1)$
(D) $f''(1)<f(1)<f'(1)$
(E) $f''(1)<f'(1)<f(1)$

7. An equation of the line tangent to the graph of $y=x+\cos x$ at the point (0, 1) is

(A) $y=2x+1$ (B) $y=x+1$ (C) $y=x$ (D) $y=x-1$ (E) $y=0$

8. What is the instantaneous rate of change at $x=2$ of the function $f$ given by $f(x)=\frac{x^2-2}{x-1}$?

(A) $-2$ (B) $\frac{1}{6}$ (C) $\frac{1}{2}$ (D) 2 (E) 6

9. If $f(x)=\tan(2x)$, then $f'\left(\frac{\pi}{6}\right)=$

(A) $\sqrt{3}$ (B) $2\sqrt{3}$ (C) 4 (D) $4\sqrt{3}$ (E) 8

10.

| $x$ | 2 | 5 | 7 | 8 |
|---|---|---|---|---|
| $f(x)$ | 10 | 30 | 40 | 20 |

The function $f$ is continuous on the closed interval [2, 8] and has values that are given in the table above. Using the subintervals [2, 5], [5, 7], and [7, 8], what is the trapezoidal approximation of $\int_2^8 f(x)dx$?

(A) 110 (B) 130 (C) 160 (D) 190 (E) 210

11. Let $f$ be the function given by $f(x)=|x|$. Which of the following statements about $f$ are true?

I. $f$ is continuous at $x=0$.
II. $f$ is differentiable at $x=0$.
III. $f$ has an absolute minimum at $x=0$.

(A) I only (B) II only (C) III only (D) I and III only (E) II and III only

12. If $g$ is a differentiable function such that for all real numbers $x$, $g(x)<0$ and $f'(x)=(x^2-4)g(x)$, which of the following is true?

(A) $f$ has a relative maximum at $x=-2$ and a relative minimum at $x=2$.
(B) $f$ has a relative minimum at $x=-2$ and a relative maximum at $x=2$.
(C) $f$ has a relative minimum at $x=-2$ and at $x=2$.
(D) $f$ has a relative maximum at $x=-2$ and at $x=2$.
(E) It cannot be determined if $f$ has any relative extrema.

14. If $f(x)=x\sqrt{2x-3}$, then $f'(x)=$

(A) $\frac{3x-3}{\sqrt{2x-3}}$ (B) $\frac{x}{\sqrt{2x-3}}$ (C) $\frac{1}{\sqrt{2x-3}}$ (D) $\frac{-x+3}{\sqrt{2x-3}}$ (E) $\frac{5x-6}{2\sqrt{2x-3}}$

15. If $\int_a^b f(x)dx=a+2b$, then $\int_a^b (f(x)+5)dx=$

(A) $a+2b+5$ (B) $5b-5a$ (C) $7b-4a$ (D) $7b-5a$ (E) $7b-6a$

16. $\frac{d}{dx}\left[\cos^2(x^3)\right]=$

(A) $6x^2\sin(x^3)\cos(x^3)$ (B) $6x^2\cos(x^3)$ (C) $\sin^2(x^3)$
(D) $-6x^2\sin(x^3)\cos(x^3)$ (E) $-2\sin(x^3)\cos(x^3)$